CLASSIFICATION SECRET/SECURITY INFORMATION

[redacted]

CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

SECRET

COUNTRY USSR/Germany (Soviet Zone)

SUBJECT Soviet Army Anti-Aircraft Practices and Equipment

PLACE ACQUIRI [redacted]

DATE ACQUIR [redacted]

DATE OF [redacted]

DATE DISTR. 19 Mar 52

NO. OF PAGES 5

25X1

NO. OF ENCLS. (LISTED BELOW) 25X1

SUPPLEMENT TO REPORT NO.

THIS IS UNEVALUATED INFORMAT[redacted] 25X1

[redacted]

[redacted] the "Malakhit" anti-aircraft radar at a lecture by my commanding officer [redacted] 25X1 25X1

[redacted] 25X1

The name of the commanding officer was Lt Col Semenchuk.

[redacted] 25X1

Lt Col Semenchuk had just returned from an eight months' advanced course at Baku on new weapons and devices, at an artillery technical school. He spoke with authority and confidence.

25X1

[redacted] 25X1

The "Malakhit" radar is of recent design. 25X1

[redacted]

"Malakhit" radar was said to be adaptable to, and intended for use with, all types of anti-aircraft guns. 25X1

SECRET

CLASSIFICATION SECRET/SECURITY INFORMATION

				DISTRIBUTION				
STATE X	NAVY X							
ARMY X	AIR X	AEC X	FBI X					

ARCHI[ARMY review completed.]

PLEASE[...]

AGENCY ARCHIVES, BLDG. A-18

22/558/1

SECRET

25X1

25X1

It was designed specifically for anti-aircraft fire-control, and is used in connection with all medium and heavy AA guns in "PVO" defense of major "1st class" cities.

25X1

"Malakhit" is definitely mobile.

25X1

The complete "Malakhit" AA system consists of a radar and computer installed in a single vehicle, plus electro-mechanical data transmission and indication means for an associated battery.

25X1

It controls one battery only, as compared with the older "SON" radars which service four batteries.

25X1

It was said to be impractical for tactical fire-control.

25X1

25X1 "Malakhit" is able to "search" out to 50 km on occasion, but to operate reliably to 28 km.

25X1

The altitude capability of "Malakhit" was stated to be about 10 km for fire-control functioning. Please remember that all of my knowledge of "Malakhit" came from a lecture.

25X1

25X1 With "Malakhit", it was said that all computing was done in the radar vehicle itself, with the final data being transmitted by "Selsyn" type electro-mechanical means to the battery position up to some 600 meters away. This was a great improvement over the older "SON" type radar installations, in which "PUAZO" mechanical predictors were situated at each battery position, with the radar information being sent to them from the "SON" point by telephone.

25X1

Gun-aiming is effected manually, by reference to the "Selsyn" type indicators mentioned above. Thus the elevation, azimuth, and automatic range-setting controls are actuated by the gunners in accordance with the motion of the indicators. In the "SON" system, a telephone operator at each battery calls out the three types of information to the "PUAZO" operators as it arrives. Thus the operator at each battery may call out first, azimuth information, then elevation, etc. The "Malakhit" means of information presentation at the guns is a "polar coordinate" system. The gunners followed, with manual controls, the indications of associated automatically operated (by the radar) dials or drums. 25X1 "Malakhit" has its own computer, and does not use a "PUAZO" at the battery. The "Malakhit" system was believed to be much superior to the older 25X1 "SON-PUAZO" combinations. In this connection, it was said that the "PUAZO 3" is still widely used, but that its intended successor, "PUAZO 4", was discontinued soon after its 25X1 introduction in 1948. No radio tubes were ever seen in any of the "PUAZO'S", there was a possibility of any of the models being electronically 25X1 operated since "PUAZO'S" are purely mechanical devices.

25X1

25X1 about eleven men were required to operate the "Malakhit" radar and computer, including the gas-electric power supply. In comparison, at least 40 men were required to operate "SON-2" complete with four batteries of four guns each. Two parts of the "SON-2" were to obtain and interpret data at the central location, with additional personnel working at each battery, operating the "PUAZO" computers. As was mentioned previously, the three types of data are telephoned from the "SON" position out to the batteries, where a single telephone operator at each is required to relay the information verbally

to the "PUAZO" operators. Since "Malakhit" controls only one battery, forty-four men and four "Malakhits" would be needed to match the four batteries controled by one "SON".

25X1

"Malakhit, by means of its computer, supplies its own "K" factor.

25X1

25X1

"Malakhit" was said to be much smaller - more compact - than "SON" radars.

Yes, provision for connection, through transformers, to local power supply systems was included in both "Malakhit" and "SON" radar installations. 25X1

25X1

a new 57 mm (Bofors type ?) gun which has been developed, 25X1
produced, and already deployed specifically for use against low-flying jet aircraft. This 57 mm gun incorporates a special fire-direction instrument. The gunner, who sits 25X1
on the gun-carriage and moves around with it, sights this device visually on the low-flying (under 2000 ft.) aircraft. However, information concerning the general direction from which the aircraft are approaching is also supplied to the gunner from an associated "Malakhit" radar which, is used for acquisition - search only. the exact manner in which the fire-direction information was presented, however, it was transmitted by electro-mechanical (synchro-selsyn type) means, with 25X1
a polar-coordinate presentation of some sort. the 25X1
exact manner in which the azimuth and elevation angles from the "Malakhit" were indicated to the gunner as he aimed the fire-direction instrument. 25X1

25X1 25X1

The aircraft position data, as derived from the visual-tracking instrument sighted by the gunner, was transmitted to a small computer standing nearby. The computer then supplied the actual gun-aiming data to the gun. whether the gun was ther 25X1
pointed manually with reference to the aiming-information from the computer, or automatically by means of servo-mechanisms. The whole system was very modern and effective, and a great improvement over previous direct-aiming methods. In addition, the importance of the improvement afforded by the use of the associated "Malakhit" radar in the effectiveness of the 57 mm gun should not be overlooked.

25X1

many of these 57 mm "Malakhit"-gun combinations were deployed in the USSR, 25X1
and in particular along the Polish border.

25X1

The gun was first manufactured in Czechoslovakia, and later in the USSR 25X1
whether the radar had also been manufactured in Czechoslovakia or not.

25X1

The range of the gun was 10 km, with altitude operation up to 6 km. The muzzle velocity was 1100 meters/second, with a firing rate of two to three per second.

No, the 57 mm gun would not normally use radar in army ground tactical deployment with troops, unless it were protecting some particularly important point or object such as a

25X1

25X1

whether or not tracers were used with the 57 mm gun. normal operation of the gun with associated radar was for daylight use against low-flying jet aircraft. small Bofors usually used tracers.

25X1

25X1

25X1

the 57 mm gun and direction device are mobile.

25X1

Night-firing anti-aircraft practice took place at Koenigsbruck and Stettin ranges, firing out to sea. A target was towed 3 km behind slow aircraft (120 meters/second), which generally flew at six km altitude. A "SON-3" radar was used, and gunnery was satisfactory. A sleeve-type target was in use.

25X1

25X1 25X1 25X1 25X1 25X1

the "PRS-3", "RUS", and "REDUT" radar equipments but they ar25X1 rather old and in some cases obsolete. the "SP" radar was a very small, 25X1 mobile set.

25X1

25X1

a large radar school for the Soviet Army and Air Force exists at Kharkov, and that courses in artillery radar are given there. a large new- 25X1 weapons school, the name of which is "Elektro-Reaktivnyy Snaryad" ("ERS"), is located at Kharkov.

25X1

work on this device, on guided missiles, and on rockets, was being done at a large experimental station somewhere in the Caucasus, possibly near "Maykap", 25X1 and also that a special artillery range was situated there. some 25X1 missile firings having occured at "Maykap" in 1950.

Leningrad, Moscow, Baku, Sevastapol, and Khabarovsk are the priority cities for air defense attention. Each city has an air defense army consisting of anti-aircraft, fighter aircraft, radar, searchlight, and smoke-screen units.

25X1

25X1

Soviet tanks use gyro-stabilized guns - stabilized in pitch but not in roll.

25X1

An 85 mm anti-aircraft regiment has 96 guns, arranged in 16 batteries.

-end-

25X1